AUTHOR INDEX

Adams, G. E. 405
Ainsworth, E. J. 223
Anderson, M. E. 115
Arakali, A. V. 149
Astor, M. B. 115

Badger, C. C. 33
Battaini, F. 385
Biaglow, J. E. 269, 275
Blakely, W. F. 219
Bogo, V. 73, 93
Bonner, H. S. 195
Box, H. C. 149
Briggs, D. B. 367
Brock, W. A. 179
Brown, D. Q. 157, 195
Brown, J. M. 293
Buchner, J. 219

Carmeli, F. 85
Carpenter, D. O. 367
Chatterjee, A. 323
Chin, L. 215
Chirigos, M. A. 243, 247
Clark, E. P 275
Collins, P. W. 347

D'Alesandro, M. M. 247
Das, R. M. 327
Davis, H. D. 97
Davis, L. 357
Del Soldato, P. 155
Denekamp, J. 59
Dominitz, J. A. 97
Donlon, M. A. 373
Dubois, A. 67

Edmondson, S. E. 89
Epp, E. R. 275

Fahey, R. C. 101
Fleckenstein, L. 203
Fox, K. R. 3
Franz, C. G. 93
Freed, B. M. 267
Freeman, L. M. 215
Friedenthal, E. 357

Geraci, J. P. 45
Giometti, C. S. 133
Glick, J. H. 3, 195
Glover, D. 3, 195
Govoni, S. 385
Graham III, W. J. 157
Grdina, D. J. 21, 133
Green, M. 311
Greenstock, C. L. 139
Groenendijk, R. H. 147
Grunbaum, Z. 215
Guilford, W. H. 133

Hale, M. L. 79
Hanson, W. R. 347
Harding, R. K. 335
Held, K. D. 123
Hodgkiss, R. J. 389
Holtzman, S. 357
Houseman, K. A. 347
Hrushesky, W. J. M. 397

Ikeda, A. 331

Jackson, K. L. 45
Jacob-Raman, M. 323
Jacobs, A. J. 93

Kalinich, J. F. 379
Kanofsky, J. D. 357
Kinoshita, T. 331
Kligerman, M. M. 3, 195
Kol, R. 311
Kondi-Tamba, A. 255
Kopolovic, J. 85
Krohn, K. A. 33, 89, 195
Kumar, K. S. 301

Landauer, M. R. 97
Lawrence, D. A. 267
Lempert, N. 267
Ligumski, M. 85
Livesey, J. C. 33, 215
Lohman, P. H. M. 147
Ludden, T. M. 203

Mackenzie, L. J. 157
Magee, S. 215
Maisin, J. R. 189, 255
Malakar, K. 327
Mangold, D. J. 203
Mariano, M. S. 45
Marko, R. 311
Matsubara, J. 331
Mattelin, G. 255
McCarthy, K. F. 79
Meister, A. 115
Mendecki, J. 357
Meyn, R. E. 151, 179
Milas, L. 151, 179
Mintsberg, M. 311
Mitchell, J. B. 269
Murray, D. 151, 179

Nagy, B. 21
Nelson, N. J. 215
Neta, R. 261
Norfleet, A. L. 195

Painter, R. B. 287
Paoletti, R. 385
Patchen, M. L. 243, 247
Patterson, D. A. 267
Paul, C. R. 149
Petrella, M. 393
Phillips, T. L. 403
Pittock III, J. W. 157
Pizzitola, V. 219
Prager, A. 311

Quintiliani, M. 155

Rachmilewitz, D. 85
Raleigh, J. A. 109

Rapoport, R. 267
Rasey, J. S. 33, 89, 215
Riklis, E. 311
Rojas, A. 59
Roos-Verhey, W. S. D. 169
Roy, R. M. 393
Russo, A. 269

Scheving, L. E. 397
Seifter, E. 357
Shateri, H. 393
Shaw, L. M. 157, 195
Shimoyama, T. 331
Sigdestad, C. P. 21, 133
Simic, M. G. 1
Simone, G. 155
Sothern, R. B. 397
Spence, A. M. 33, 89
Steele, J. E. 89
Stevens, G. 59
Stratford, M. R. L. 389
Strominger, N. L. 367
Swynnerton, N. F. 203

Tajima, Y. 331
Tamba, M. 155
Taylor, Y. C. 293
Thomas, B. 213
Tochner, Z. 85
Topalova, S. 255
Trabucchi, M. 385
Tsai, T. H. 397
Turrisi, A. 3, 195

Uma Devi, P. 213

Vaishnav, Y. N. 301
VanAnkeren, S. C. 151
Van Der Schans, G. P. 147
Varnes, M. E. 275
Vera, D. M. 33
Vertrees, S. 215
Vos, O. 169

Walden Jr, T. L. 219, 379
Walker, R. I. 9, 13
Watfa, R. R. 389
Weiler, C. 3, 195
Weinzweig, J. 357
Weiss, J. F. 1, 93, 97, 247, 301
Weshler, Z. 85

Young, R. W. 27, 93

SUBJECT INDEX

Absorption, factors affecting 204
N-Acetylcysteine
  behavioral toxicity 97–9
  X-ray survival 272
Adverse reactions
  behavioral radioprotectors 76, 77
  radioprotectors 192
  radiotherapy 335
  sulfhydryl compounds 98
  WR-2721 4, 5, 338
Alper-Howard-Flanders equation 118
Aminothiols, DNA damage and survival 151, 152
Anti-emetics 75, 76
  drugs and classes 336–8
  and radioprotection 338, 339
Antioxidants 140, 142, 403
  cell ascorbate 390, 391
  enzymes and radioprotection 203–5
    in vivo 304, 305
  induction 307
  mimetics 305–7
  in radioprotection 275–85, 301–8, 389–91
Arachidonic acid cascade 347
  product, radioprotection 348, 349
Attenuators 74, 75
Azimexone and myelomoiesis 245

Behavioral toxicity, radioprotectors 97–9
Bioavailability
  factors affecting 204
    physiological 205, 206
  WR-2721 203–11
Biological response modulators (BRM) 243–6, 404
  —aminothiol combinations 251–3
  —BRM combinations 251
  cell populations regulated 243–5
  —induced cytokine cascade 243
  WR-2721 radioprotection 247–53
Bone marrow
  cell protection, drug combinations 213, 214
  cell reconstitution 246
  dose–response 80, 81
  radioresistance 82
  survival curves 82
Buthionine sulfoximine (BSO) 169
  A549 cells and glutathione 277
  aerobic radiation response 278
  glutathione content 281
  glutathione depletion 389
  peroxide breakdown 279
  protection 172–4
t-Butylhydroperoxide (*t*-BOOH) 282

Calcium
  antagonists 385
    cytoprotection 387
    pharmacology 386
  homeostasis 385
β-Carotene
  antioxidant effects 362, 363
  mitochondrial protection 364
  phagocytic activity 361, 362
  radiation therapy 359, 360
  radioprotection 363, 364
Cells
  hydroxyl radical reactivities 139
  radiation chemistry 139–44
Cell cycle, WR-1065 effects 135, 136
Chemoprotection 297
  glutathione levels 298
Chernobyl
  bone marrow transplants 30
  complications 31, 32
  diagnostic procedures 28, 29
  hospital treatment 29, 30
  infection 30, 31
  medical treatment 28
  short-term effects 27–32
  treatment efficacy 32
  triage 28
Chromosome aberrations, superoxide dismutase 323–5
Circadian rhythms
  doxorubicin effects 401
  methylene blue effects 399, 400
  radiation resistance 397–401
Colony forming units (CFU) and endotoxin protection 230–3
Counterion condensation, theory 103–5
Cyclophosphamide, radiomimetic effects 234, 236, 357
Cysteamine
  behavioral toxicity 97–9
  radioprotection of DNA 143
Cytokine
  in vivo effects 261, 262
  radioprotection role 261–5
Cytokine production
  cascade 243, 244
  cell regulation and radioprotection 245

d(ApT), irradiation and radioprotection 149, 150
Dazopride 69
Delivery methods
  and bioavailability 208, 209
  and formulation 210
  WR-2721 203–11
Diamide, cell content 270, 271
Diethyldithiocarbamate, (DDC)
  behavioral toxicity 97–9
  oxidation *in vivo* 306
Dimethylsulfoxide 406
Dithiothreitol (DTT), mammalian DNA protection 123–8
DNA
  breaks 147, 148
    detection 147, 148
    modifier effects 314–17
    and oxygen 38
    radioprotection 151, 152
  counterion condensation 103–5
  damage measurement 127
  H donation 128
  hydroxyl reactions 102, 103
  peroxyl radicals 125
  protection factor 105, 106
  radiation chemistry 101, 102
  sedimentation gradient 313, 314
  thiol effects 126–8

thiol protection 101–7
thiol protection models 123–30
transforming damage decay 126
DNA damage, WR-1065 effects 133–6
DNA repair
enzyme enhancement 287, 288
radioprotection 311–22
light damage 314–17
modifiers 314–18
nicotinamide 317–21
strand breaks 318
study methods 311, 312
synthesis and modifiers 316
WR-1065 effects 133–6
WR-2721 effects 312–14
DNA transfection, enzyme enhancement 289, 290
Domperidone, radiation-induced lesions 369
Dose-modifying factor 403
Dose-reduction factor 159

Endotoxin protection 223–39
chemical properties 227
colony forming units 235–7
hematopoietic recovery 230–3
history 223–5
and hypoxia 228, 229
preirradiation administration 229, 230
reticuloendothelial system 227, 228
species differences 226, 227
split-dose lethality 233–5
time taken 225, 226
Enzyme mechanisms, enhancement 287–91
Enzyme mimetics 305–7
Ethiofos *see* WR-2721

Flow cytometry, radiosensitivity measurement 79–83
Free-radical
formation 301
scavengers 156

Gas explosion technique 126
Gastric emptying 68
Gastrointestinal ulcers 156 *see also* intestinal
Gel permeation chromatography, irradiated DNA 142, 143
Gene amplification and DNA repair 288, 289
Glucan
dose-reduction factors 256
-mediated radioprotection 245–50
radioprotector combination 250, 251
Saccharomyces sp 255
structure 248
Glutathione (GSH)
adenocarcinoma and hypoxia 270
cell determination 116
cell level evaluation 293–8
and depletion 295, 296
-deficient fibroblasts 117
depletion and cell survival 119, 276–8
esters and protection 170–2
air 171
cell types 172
nitrogen 172
hypoxic cell radiosensitivity 115–21
inhibitor effects 294
inhibitor studies 296, 297
intracellular 116
manipulation 293
mass spectra 220
measurements 294
oxygen K-factor 118
radioprotection 170, 269–73, 298
tissue levels 38, 39
γ-radiation
carcinogenic 360, 361
cocarcinogenic 360

Hematopoietic radioprotection 159
Hematopoietic recovery, endotoxin protection 230–3
Hematopoietic syndrome 10, 11
Histamine antagonists 375
History, radioprotection 1, 2
Hydrogen peroxide, T-cell response 267, 268
Hydroxyl radicals, cell component effects 139
Hypoxanthine-guanine phosphoribosyl transferase (HGPRT) and radioprotection 22, 23, 406
Hypoxic cells, radiosensitivity and glutathione 115–21

Immunomodulators 237–9
Indomethacin, radiation-induced lesions 369
Interleukin-1
acute phase protein 265
bone marrow effects 264
cell cycling induction 263, 264
radioprotection 262
and prostaglandins 264
Intestinal death
acute, mechanisms 45–54
antibiotic effects 47
bile acids 48, 49
bile duct ligation 50, 51
cholecystectomy 51
endotoxemia 46–8
fluid–electrolyte loss 49–52
fluid–electrolyte pathways 53
mucosal recovery 54
sepsis 46
whole-body compartmentalization 52, 53
Intestinal injury 67–71
animal models 67, 68
late effect 71
subacute syndrome 70, 71

Leukotrienes
radioprotection 380
receptor mechanism 381
structures 379
synthesis 379, 380
Liver radiosensitivity 40
Lung damage, superoxide dismutase effects 327–30
Lung radioprotection 159, 160
Lymphocyte *see also* T-cells
Muntjac 324

Malonyldialdehyde
culture production and thiols 281, 282
factors affecting production 285
Mannan mannozyme (MNZ) 255
bone marrow survival 257, 258
Mast cell mediators, physiology 373
Membrane
lipid peroxidation 111, 112
radiobiology 109
radioprotection 109–12

Metabolism
WR-2721 197, 206, 215, 216
WR-3865 215, 216
media effects 216
Metallothionein 331–3
mouse mortality 332
survival and irradiation 331
Methylene blue, circadian radiation resistance 397–401
Microbial polysaccharides 223–39
protection mechanism 238
radioprotection 255–8
Military, radioprotector needs 13–19
Misoprostol 351, 352

Neuroleptics, antiemetic 336
Neurovascular syndrome 9–11
Nicotinamide
DNA repair 317–21
melanoma cells 319
role 319
NAD level and irradiation 320

Oxygen
and cell survival, radiation 60
-enhancement ratios 119
fixation competition model 405
radioprotection role 36, 37, 59–65
sensitization 407

Pentose cycle 283
Peroxide production
lipids 280
metabolism scheme 302
Pharmacokinetics, WR-2721 208
Phosphorothiates *see also* WR-2721
factors affecting protection 34–40
radioprotection mechanism 33
Polyadenosinediphosphoribose (PADPR) and DNA repair 317
Prodromal radiation effects 335–42
Prostaglandins
analogs 350–3
protection efficacy 350
structures 350
survival rates 351, 352
cytoprotection 347, 348
radioprotection *in vivo* 347–55
radioprotector interactions 354, 355
structure–activity relationships 353
Protection factor (PF) 61, 62
and oxygen concentration 64, 65

Radiation
acute syndromes 189
life-threatening syndromes 10, 11
Radiation-induced performance, decrement 73
Radiation-induced vomiting
mechanism 339, 340
sensitivity 340
Radiation injury
acute 9–12
combined 11, 12
intestinal, protection 45–55
molecular mechanisms 140–2
Radioprotection
behavioral
attenuators 74, 75
categories 73
toxicity 76, 77
free radical reactions 141

Radioprotectors
antiemetics 338, 339
combination 189–92, 213, 214
combined injury 17, 18
dose reduction factors 14, 161, 162
effectiveness modification 18
enzyme enhancement 287–91
first generation 16
hydrophilic 165
hypothermia effects 160, 161
lipophilic 165
membranes 109–12
military needs 13–19
oxygen levels 61–4
oxygen role 36, 37, 59–65
performance decrement 16, 17
pH effects 162
screening 157–67
secondary tumors 21–5
testing 59–65
toxicity 192
Radiosensitivity
factors affecting 140
oxygen dependence 36, 37, 59
DNA strand breaks 38
rat marrow measurement 79–83
Receptors
histamine 374, 375
actions 375
agents 375
LTC_4, radioprotection 381, 382
Redox balance, fixation and repair 60, 61
Redox enzymes
pentose cycle 284
radioprotection 275–85
Repair-fixation model, DNA damage 124

Spinal cord
hind limb paralysis 90
radioprotectors 89–91
Stem cells, radioprotection 14–16
Stomach *see also* gastric and intestinal
isolated, injury model 85–7
acid output 86
morphological changes and irradiation 86
Streptozotocin, radiomimetic 357
Superoxide dismutase
chromosome aberrations 323–5
pulmonary damage 327–30
radioprotective 328
respiratory rate 329
Superoxide radical, lipid peroxidation 110, 111

T-cell response inhibition and hydrogen peroxide 267, 268
Thermospray liquid chromatography, mass spectrometry 219–21
Thiol depletors 282–4
methods 294
Thiols
dependent enzymes 271
DNA irradiation 142, 143
DNA protection 101–7
endogenous 169–75, 271
and exogenous 169–75
nucleic acid reaction rates 124
oxidative damage 155, 156
radiation chemistry 101, 102
repair rates 103
Tocopherols 111, 112
blasting response 394
lymphocyte survival 393–5

Tumor radioprotection 163, 164
  molecular mechanisms 184, 185
Tumor radiotherapy
  induced tumors 183
  metastatic spread 182
  radioprotectors 179
    irradiation type 180, 181
Typhoid, paratyphoid vaccine (TAB) 253–5

Visual discrimination performance
  assessment 93
  early transient incapacitation 95
  irradiation 94
  WR-2721 and irradiation 93–5
Vitamin A
  antioxidant effects 362, 363
  carcinogenic and γ-radiation 360, 361
  mitochondrial protection 364
  radiation protection 363, 364
  radiation therapy 359, 360
  total body irradiation 358, 359
Vomiting
  area postrema record 369, 370
  radiation-induced mechanisms 367–70
    lesion effects 368
  siphon analogy 341, 342
Vomiting center 340

WR-1065
  cell transformation 23
  DNA damage and repair 133–6
  HGPRT locus protection 22, 23
  mass spectra 220
  mechanism of action 24
  prodrugs 210
  protein effects 134, 135
  structure 203
  tumor radioprotection 183
WR-2721
  alkaline phosphatase hydrolysis 199
  behavioral toxicity 97–9
  bioavailability testing 207–9
  biological response modulator combination 247–53
  body distribution 195, 196
  carcinogenesis protection 23
  cell injury protection 21, 22
  cell survival in oxygen 63
  chemical modifiers 166
  cis-platinum 5
  clinical trials 3–7
  cyclophosphamide 5, 6
  DNA repair 312–14
  dose modifying factor 34
  dose-reduction factors 158
  dose response and oxygen 63, 64
  formula 157
  kidney dysfunction 5, 64
  LD_{50} 15
  mass spectra 219–21
  measurement 196, 197
  mechanism of action 24, 39, 40
  metabolism 197, 206
    cancer patients 198, 199
    mice 197, 198
  metabolite measurement 196, 197
  mouse tissues 180
  multiple fractionated doses 41
  oxygen dependency 36–8
  pharmacokinetics 195–200
  potentiation 6, 7
  screening 164, 165
  spinal cord protection 89–91
  structure 158, 203
  toxicity 4
  tumor radiotherapy 179–86
  visual discrimination performance 93–5
  WR-1065 levels in tissue 36
WR-3839
  comparison 165
  features 164
  spinal cord protection 89–91
  structure 203, 210, 211
WR-77913, spinal cord protection 89–91

X-irradiation
  late damage 191, 192
  mouse mortality 189–91
    and radioprotectors 190, 191

Zacopride 69